

U.S. Application No.
Unknown

International Application No.
PCT/AU00/00646

Attorney Docket No.
DUMME14.001APC

10/009947 Page 1

Date: December 10, 2001

**TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 USC 371**

International Application No.: PCT/AU00/00646
International Filing Date: June 8, 2000
Priority Date Claimed: June 9, 1999
Title of Invention: MATERIALS HANDLING SYSTEM
Applicant(s) for DO/EO/US: Laurence Michael Byrne

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 USC 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 USC 371.
3. ☒ This express request to begin national examination procedures (35 USC 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 USC 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 USC 371(c)(2))
 - a) ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b) ☒ has been transmitted by the International Bureau.
 - c) ☐ a copy of Form PCT/1B/308 is enclosed.
 - d) ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 USC 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 USC 371(c)(3))
 - a) ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b) ☐ have been transmitted by the International Bureau.
 - c) ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d) ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 USC 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 USC 371(c)(4)).
10. ☒ A copy of the International Preliminary Examination Report with any annexes thereto, such as any amendments made under PCT Article 34.
11. ☐ A translation of the annexes, such as any amendments made under PCT Article 34, to the International Preliminary Examination Report under PCT Article 36 (35 USC 371(c)(5)).

U.S. Application No.
Unknown

International Application No.
PCT/AU00/00646

10/009947

Attorney Docket No.
DUMME14.001APC

JC05 Rec'd PCT/PTO 10 DEC 2001
Page 2

Date: December 10, 2001

12. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
13. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
14. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A power of attorney and/or address letter.
17. ☒ International Application as published.
18. ☒ The present application qualifies for small entity status under 37 C.F.R. § 1.27.
19. ☒ International Search Report.
20. ☒ A return prepaid postcard.
21. ☒ The following fees are submitted:

| | | | | FEES |
|--|-----------------|-----------------|-------|---------|
| BASIC FEE | | | | \$1,040 |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | |
| Total Claims | 19 - 20 = | 0 × | \$18 | \$0 |
| Independent Claims | 3 - 3 = | 0 × | \$84 | \$0 |
| Multiple dependent claims(s) (if applicable) | | | \$280 | \$0 |
| TOTAL OF ABOVE CALCULATIONS | | | | \$1,040 |
| Reduction by 1/2 for filing by small entity (if applicable). Verified Small Entity statement must also be filed. (NOTE 37 CFR 1.9, 1.27, 1.28) | | | | \$520 |
| TOTAL NATIONAL FEE | | | | \$520 |
| TOTAL FEES ENCLOSED | | | | \$520 |
| amount to be refunded: | | | | \$0 |
| amount to be charged: | | | | \$0 |

22. ☒ The fee for later submission of the signed oath or declaration set forth in 37 CFR 1.492(e) will be paid upon submission of the declaration.
23. ☒ A check in the amount of \$520 to cover the above fees is enclosed.

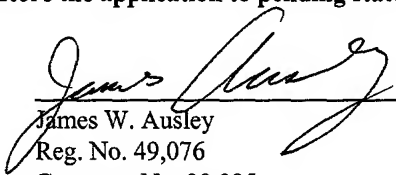
Date: December 10, 2001

Page 3

24. ☐ Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property.
25. ☒ The Commissioner is hereby authorized to charge only those additional fees which may be required, now or in the future, to avoid abandonment of the application, or credit any overpayment to Deposit Account No. 11-1410.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:


James W. Ausley
Reg. No. 49,076
Customer No. 20,995

R:\DOCS\JWA\JWA-2000.DOC
121001

204050-24650001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : BYRNE, Laurence Michael) Group Art Unit Unknown
)
 PCT Appl. No.: PCT/AU00/00646)
)
 Filed : Herewith)
)
 For : MATERIALS HANDLING)
 SYSTEM)
)
 Examiner : Unknown)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
 Washington, D.C. 20231

Dear Sir:

Prior to examination, please amend the above referenced application as follows:

IN THE ABSTRACT:

Please delete the abstract and insert the following amended abstract.

--Abstract of the Disclosure

A rail car having a chassis adapted to travel on a track extending from a collection point to a remote distribution point, a longitudinally extending container for compacted material, the container having a closable opening for loading and/or unloading of the material through at least one end of the container, an interconnector joining the container and the chassis so as to allow displacement therebetween to facilitate in situ loading of the container via the closable opening, a loader located at the collection point adapted to load the material into the container, and an unloader at the remote distribution point for unloading the material. The container is displaced relative the chassis to operatively engage the loader and the unloader.--

IN THE SPECIFICATION:

Page 1, immediately after the title "MATERIALS HANDLING SYSTEM", please insert –
Related Applications This application claims the benefit of the Australian application PQ 1810
filed June 9, 1999 and the international application PCT/AU00/00646 filed June 8, 2000.—

IN THE CLAIMS:

Please amend the Claims as follows:

1. (Amended) A rail car comprising:
a chassis adapted to travel on a track;
a longitudinally extending container having a closeable opening for loading or
unloading material through at least one longitudinal end thereof; and
an interconnector adapted to enable interconnected displacement of the container
relative to the chassis to permit loading via the closeable opening wherein the container is
adapted to stably withstand the compression of the waste material within the container.
2. (Amended) The rail car of claim 1 wherein the interconnector comprises a
bearing between the container and chassis such that the container is selectively rotatable relative
to the chassis.
3. (Amended) The rail car of Claim 1, wherein both of the longitudinal ends have
a closeable opening for loading or unloading material.
4. (Amended) A materials handling system including:
a rail car having a chassis adapted to travel on a track;
a longitudinally extending container for compacted material, the container having
a closeable opening for loading or unloading material through at least one longitudinal
end thereof, and an interconnector adapted to enable interconnected displacement of the
container relative to the chassis to permit in situ loading via the closeable opening;
a loader at a materials collection point for loading material into the container
through the opening;
a track for the rail car extending from the collection point to a remote distribution
point; and

an unloader at the distribution point for unloading material from the container through the opening wherein the container is displaced relative to the chassis to operatively engage the loader and again displaced when unloading the material.

5. (Amended) The materials handling system of Claim 4, wherein the interconnector comprises a bearing between the container and the chassis such that the container is selectively rotatable relative to the chassis.

6. (Amended) The materials handling system of Claim 4 wherein the material is loaded and unloaded through the closable opening.

7. (Amended) The materials handling system of Claim 4, wherein the material is metropolitan waste and the collection point is a regional transfer station wherein the loader includes a compactor for compressing the waste.

8. (Amended) The materials handling system of Claim 7, wherein at least one stabilizer is provided to support and stabilize the rail car against forces generated by the compactor.

9. (Amended) The materials handling system of Claim 4, wherein the distribution point is adjacent a land fill site and the unloader comprises a hydraulically actuated telescopic ram capable of engaging the compressed waste through one opening in the container and pushing the waste out an opening in the other end of the container.

10. (Amended) The materials handling system of Claim 9, wherein the telescopic ram pushes the compressed waste out of the other end of the container into the trailer of a heavy haulage truck.

11. (Amended) The materials handling system of Claim 10, wherein the trailer of the heavy haulage truck is provided with a conveyor along a floor of the trailer for unloading the waste into the land fill site.

12. (Amended) A method of transporting material between a collection point and a distribution point by rail using a rail car having a chassis adapted to travel on a track, a longitudinally extending container having a closeable opening for loading or unloading material through at least one longitudinal end thereof, and an interconnector adapted to permit interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening, the method comprising:

providing a loader at the collection point;

PCT Appl. No. : PCT/AU00/00646
Filed : Herewith

displacing the container relative to the chassis to operatively engage the loader and loading material through the opening;

returning the container to its original position relative to the chassis and transporting the rail car along the track to the distribution point;

providing an unloader at the distribution point; and

displacing the container relative to the chassis to operatively engage the unloader and unloading the material.

13. (Amended) The method of Claim 12 wherein the interconnector comprises a bearing between the container and the chassis such that the container is selectively rotatable relative to the chassis.

14. (Amended) The method of Claim 12 wherein the material is loaded and unloaded through the closable opening.

15. (Amended) The method of Claim 12 wherein the material is metropolitan waste and the collection point is a regional transfer station the method further comprising compressing the waste with a compactor.

16. (Amended) The method of Claim 15 further comprising stabilizing the rail car against forces generated by the compactor.

17. (Amended) The method of Claim 12 wherein the distribution point is adjacent a land fill site and the unloader is a hydraulically actuated telescopic ram the method further comprising engaging the compressed waste through one opening in the container and pushing it out an opening in the other end of the container.

18. (Amended) The method of Claim 17 further comprising pushing the compressed waste out of the other end of the container into the trailer of a heavy haulage truck.

19. (Amended) The method of Claim 18 further comprising conveying the waste along the floor of the trailer so as to unload the waste into the land fill site.

PCT Appl. No. : PCT/AU00/00646
Filed : Herewith

REMARKS

This amendment is being made to bring the subject application into better conformance with U.S. practice, to claim the benefit of previously filed international applications, and to more distinctly claim what the Applicant regards as the invention. No new matter is being introduced. Entrance of this amendment is respectfully requested. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 12/10/01

By: James W. Ausley
James W. Ausley
Registration No. 49,076
Agent of Record
620 Newport Center Drive
Sixteenth Floor
Newport Beach, CA 92660
(909) 781-9231

R:\DOCS\JWA\JWA-1986.DOC
120601

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT:

[(57) Abstract:

A rail car (17) having a chassis (12) adapted to travel on a track (13); A longitudinal extending container (6) for compacted material, the container (6) having a closeable opening (11) for loading or unloading material through at least one longitudinal end thereof, and means to enable interconnected displacement of the container (6) relative to the chassis (12) to permit in situ loading via the closeable opening (11); a loading means (4) at a material collection point for loading material into the container (6) through the opening (11); a track (13) for the rail car (7) extending from the collection point to a remote distribution point; and an unloading means (15) at the distribution point for unloading material from the container (6) through the opening (11); wherein, The container (6) is displaced relative to the chassis (12) to operatively engage the loading means (4) and again when unloading the material.]

--Abstract of the Disclosure

A rail car having a chassis adapted to travel on a track extending from a collection point to a remote distribution point, a longitudinally extending container for compacted material, the container having a closable opening for loading and/or unloading of the material through at least one end of the container, an interconnector joining the container and the chassis so as to allow displacement therebetween to facilitate in situ loading of the container via the closable opening, a loader located at the collection point adapted to load the material into the container, and an unloader at the remote distribution point for unloading the material. The container is displaced relative the chassis to operatively engage the loader and the unloader.--

IN THE SPECIFICATION:

Page 1, immediately after the title "MATERIALS HANDLING SYSTEM", please insert –
Related Applications This application claims the benefit of the Australian application PQ 1810 filed June 9, 1999 and the international application PCT/AU00/00646 filed June 8, 2000.—

IN THE CLAIMS:

Please amend the Claims as follows:

1. (Amended) A rail car **comprising** [including]:
a chassis adapted to travel on a track;
a longitudinally extending container having a closeable opening for loading or unloading [metropolitan waste] material through at least one longitudinal end thereof;
and
[means] **an interconnector adapted** to enable interconnected displacement of the container relative to the chassis to permit loading via the closeable opening [; and]
wherein the container [being] is adapted to stably withstand the compression of the waste material within the container.
2. (Amended) [A] **The** rail car [according to] **of** claim 1 wherein the [means to enable interconnected displacement of the container relative to the chassis is] **interconnector comprises** a bearing between the container and chassis such that the container is selectively rotatable relative to the chassis.
3. (Amended) [A] **The** rail car [according to claim 1 or claim 2] **of Claim 1**, wherein both of the longitudinal ends have a closeable opening for loading or unloading [waste] material.
4. (Amended) A materials handling system including:
a rail car having a chassis adapted to travel on a track;
a longitudinally extending container for compacted material, the container having a closeable opening for loading or unloading material through at least one longitudinal end thereof, and [means] **an interconnector adapted** to enable interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening;
a [loading means] **loader** at a materials collection point for loading material into the container through the opening;
a track for the rail car extending from the collection point to a remote distribution point; and

PCT Appl. No. : PCT/AU00/00646
Filed : Herewith

an [unloading means] **unloader** at the distribution point for unloading material from the container through the opening[;] wherein[,] the container is displaced relative to the chassis to operatively engage the [loading means] **loader** and again displaced when unloading the material.

5. (Amended) [A] **The** materials handling system [according to] **of** Claim 4, wherein the [means to enable interconnected displacement of the container relative to the chassis is] **interconnector comprises** a bearing between the container and the chassis such that the container is selectively rotatable relative to the chassis.

6. (Amended) [A] **The** materials handling system [according to] **of** Claim 4 wherein the material is loaded and unloaded through the closable opening.

7. (Amended) [A] **The** materials handling system [according to] **of** Claim 4, wherein the material is metropolitan waste and the collection point is a regional transfer station wherein the [loading means] **loader** includes a compactor for compressing the waste.

8. (Amended) [A] **The** materials handling system [according to] **of** Claim 7, wherein [stabilizing means are] **at least one stabilizer is** provided to support and stabilize the rail car against force[d]s generated by the compactor.

9. (Amended) [A] **The** materials handling system [according to] **of** Claim 4, wherein the distribution point is adjacent a land fill site and the [unloading means is] **unloader comprises** a hydraulically actuated telescopic ram capable of engaging the compressed waste through one opening in the container and pushing [it] **the waste** out [the] **an** the opening in the other end of the container.

10. (Amended) [A] **The** materials handling system [according to] **of** Claim 9, wherein the telescopic ram pushes the compressed waste out of the other end of the container into the trailer of a heavy haulage truck.

11. (Amended) [A] **The** materials handling system [according to] **of** Claim 10, wherein the trailer of the heavy haulage truck is provided with a conveyor [means] along [its] a floor **of the trailer** for unloading the waste into the land fill [area] site.

12. (Amended) A method of transporting material between a collection point and a distribution point by rail using a rail car having[:] a chassis adapted to travel on a track[;], a longitudinally extending container having a closeable opening for loading or unloading material through at least one longitudinal end thereof, and [means] **an interconnector adapted** to permit

PCT Appl. No. : PCT/AU00/00646
Filed : Herewith

interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening, [said method including] **the method comprising:**

providing [loading means] **a loader** at the collection point;
displacing the container relative to the chassis to operatively engage the [loading means] **loader** and loading material through the opening;
returning the container to its original position relative to the chassis and transporting the rail car along the track to the distribution point;
providing an [unloading means] **unloader** at the distribution point; and
displacing the container relative to the chassis to operatively engage the [unloading means] **unloader** and unloading the material.

13. (Amended) [A] **The** method [according to] **of** Claim 12 wherein the [means to enable interconnected displacement of the container relative to the chassis is] **interconnector comprises** a bearing between the container and the chassis such that the container is selectively rotatable relative to the chassis.

14. (Amended) [A] **The** method [according to] **of** Claim 12 wherein the material is loaded and unloaded through the closable opening.

15. (Amended) [A] **The** method [according to] **of** Claim 12 wherein the material is metropolitan waste and the collection point is a regional transfer station [wherein the loading means includes a compactor for] **the method further comprising** compressing the waste **with a compactor**.

16. (Amended) [A] **The** method [according to] **of** Claim 15 [wherein] **further comprising** stabilizing [means are provided to support and stabilize] the rail car against force[d]s generated by the compactor.

17. (Amended) [A] **The** method [according to] **of** Claim 12 wherein the distribution point is adjacent a land fill site and the [unloading means] unloader is a hydraulically actuated telescopic ram [capable of] **the method further comprising** engaging the compressed waste through one opening in the container and pushing it out [the] **an** the opening in the other end of the container.

18. (Amended) [A] **The** method [according to] **of** Claim 17 [wherein the telescopic ram pushes] **further comprising pushing** the compressed waste out of the other end of the container into the trailer of a heavy haulage truck.

PCT Appl. No. : PCT/AU00/00646
Filed : Herewith

19.(Amended) [A] The method [according to] of Claim [17 wherein the trailer of the heavy haulage truck is provided with a conveyor means along its] **18 further comprising conveying the waste along the floor of the trailer so as to [for unloading the] unload the waste into the land fill [area] site.**

4/PRTS

10/009947

PCT/AU00/00646

JC05 Rec'd PCT/PTO 10 DEC 2001

MATERIALS HANDLING SYSTEM

FIELD OF THE INVENTION

The present invention relates to a system for handling materials and in particular an environmentally sensitive system for economically transporting metropolitan waste to land
5 fill sites.

BACKGROUND OF THE INVENTION

Metropolitan waste includes household garbage and the like. Its collection and disposal is a major expense for municipal councils. Typically, garbage trucks will periodically collect household garbage from the kerb side. When the truck is full, it will
10 normally take the garbage to a transfer station. At the transfer station the garbage may be sorted to separate out any recyclables. The remaining refuse is crushed or baled in a compactor. The compressed refuse is then loaded into containers for transport to a land fill site by a semitrailer.

With the rapid growth of cities, the volume of metropolitan waste is increasing.
15 Furthermore, there is an increasing tendency to move the land fill sites further from urbanised centres. This has required a proportional increase in the number of garbage trucks and regional transfer stations. However, the cost to municipal councils is increasing disproportionately relative to the increase in the number of rate payers as more heavy haulage trucks are required to transport the refuse the greater distance from the transfer
20 station to the land fill site. This also involves greater indirect costs through the increased heavy haulage using the public road system.

In an attempt to address this, some regional transfer stations have balers or compactors that can directly engage the end of a container on the back of a semitrailer. Metropolitan waste from the garbage trucks is fed to the hoppers above the compactors

1005947-050702

10/009947

- 2 -

JC05 Rec'd PCT/PTO 1 0 DEC 2001

which compress the refuse directly into the container on the truck thereby removing the intermediate step of loading the compressed refuse into the heavy haulage truck. However in order to withstand the forces and pressures generated by the compressor, the container on the truck must be fabricated from relatively thick steel. This significantly
5 increases the weight of the container and therefore to keep the load within the maximum permissible limit for public road usage, the containers must be relatively small. Accordingly, the volume of refuse transported is compromised. Large containers can be used if the trucks do not have to travel over public roads however this is not practical when the land fill site is a large distance from the transfer station.

10 One attempt to address this involves transferring large containers of compressed refuse from the back of heavy haulage trucks onto rail cars which have much greater weight limits. The container can then be transported by rail to a point at or near the land fill site where it can be loaded back onto a heavy haulage truck and emptied into the land fill.

15 This increases the volume of refuse in each container and takes the heavy haulage trucks off public roads, however transferring the containers from the trucks to the rail cars and then from the rail cars back to the trucks is time consuming and labour intensive.

SUMMARY OF THE INVENTION

20 It is an object of the present invention to overcome or ameliorate one of the problems of the prior art or at least provide a useful alternative.

Accordingly, in a first aspect the present invention provides a rail car including:
a chassis adapted to travel on a track;

10009947.050702

- 3 -

a longitudinally extending container having a closeable opening for loading or unloading metropolitan waste material through at least one longitudinal end thereof;

means to enable interconnected displacement of the container relative to the chassis to permit loading via the closeable opening; and

5 the container being adapted to stably withstand the compression of the waste material within the container.

In a second aspect the present invention provides a materials handling system including:

a rail car having a chassis adapted to travel on a track;

10 a longitudinally extending container for compacted material, the container having a closeable opening for loading or unloading material through at least one longitudinal end thereof, and means to enable interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening;

a loading means at a materials collection point for loading material into the
15 container through the opening;

a track for the rail car extending from the collection point to a remote distribution point; and

an unloading means at the distribution point for unloading material from the container through the opening; wherein,

20 the container is displaced relative to the chassis to operatively engage the loading means and again displaced when unloading the material.

In a third aspect the present invention provides a method of transporting material between a collection point and a distribution point by rail using a rail car having:

a chassis adapted to travel on a track;

- 4 -

a longitudinally extending container having a closeable opening for loading or unloading material through at least one longitudinal end thereof; and

means to permit interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening, said method including:

5 providing loading means at the collection point;

displacing the container relative to the chassis to operatively engage the loading means and loading material through the opening;

returning the container to its original position relative to the chassis and transporting the rail car along the track to the distribution point;

10 providing an unloading means at the distribution point; and

displacing the container relative to the chassis to operatively engage the unloading means and unloading the material.

In one preferred form, the means to enable interconnected displacement of the container relative to the chassis is a bearing between the container and the chassis such
15 that the container is selectively rotatable relative to the chassis. In another preferred form, the material is loaded and unloaded through the closeable opening.

Preferably the material is metropolitan waste and the collection point is a regional transfer station wherein the loading means includes a compactor for compressing the waste. In this form stabilising means are provided to support and stabilise the rail car
20 against forces generated by the compactor.

In a further preferred form, the distribution point is adjacent a land fill site and the unloading means is a hydraulically actuated telescopic ram capable of engaging the compressed waste through one opening in the container and pushing it out the opening in

10005947-1050702

the other end of the container. In a still further preferred form of this embodiment, the telescopic ram pushes the compressed waste out of the other end of the container into the trailer of a heavy haulage truck. Conveniently the trailer of the heavy haulage truck is provided with a conveyor means along its floor for unloading the waste into the land fill area.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described by way of example only with reference to the embodiments shown in the accompanying drawings in which:

Figure 1 shows a schematic elevation of a regional transfer station according to the present invention;

Figure 2 shows a plan view of the regional transfer station shown in Figure 1;

Figure 3 is a schematic elevation of the rail car being unloaded at the distribution point; and

Figure 4 is a plan view of the unloading operation at the distribution point.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to Figures 1 and 2, metropolitan waste is collected from the kerb side by garbage trucks 1 and taken to a regional transfer station 2. The garbage trucks 1 enter the transfer station 2 and unload the metropolitan waste onto a conveyor surface 14 which feeds the hoppers 3 of each compactor 4. From this point the process can be controlled from a control room (not shown) with a single operator. Automating the operation avoids human contact with refuse or equipment that has been in contact with refuse.

The transfer station is of split level construction. The compactor is fed by a suitable bi-directional conveyor surface such as those marketed under the trademark Walking Floor ® conveyor bunkers with hardened steel slats specifically designed for waste conveyance.

- 5 The compactor 4 crushes the waste material to minimise its volume. Preferably the hydraulic compactor 4 crushes the material such that it no longer has "memory". In this field "memory" describes the degree to which material resiliently returns to its original volume after being compressed.

10 A suitable compactor is the SP industries CP-13001 compactor which has a 10 cubic metre capacity. This gives the compactor a volume displacement of 567 cubic metres per hour under continuous operation and will load a 72 cubic metre container in 8 minutes. Based on a range between 390 kg per cubic metre for dry commercial refuse to 520 kg per cubic metre for wet residential refuse, one of these compactors will load 3 containers with a maximum of 37 tonnes of refuse per hour.

- 15 The outlet 5 of the compactor 4 is operatively engaged with the open end 11 of the container 6. The compressed waste material from successive garbage trucks 1 is progressively loaded into the container 6. The hydraulic ram (not shown) of the compactor 4 ensures that the container 6 is filled to capacity. Stabilising mounts 8 and 9 hold the container 6 firm against the forces exerted by the hydraulic ram of the
20 compactor 4 during the loading process.

In the embodiments shown the container 6 is constructed from high tensile steel with 4 mm 3CR12-500 MPa stainless steel plate. Volume displacement is 72 cubic metres with feed container opening measuring 2.2 m wide by 2.6 m high.

10009947-050703

- 7 -

The head of the compactor is designed with 3 vertical pinning tunnels (not shown) into which overhead pins (not shown) penetrate when the container is full. The pins limit the degree of memory in the compacted refuse.

When the container 6 is full, the open end 11 of the container is shut and the
5 stabilising mounts 8 and 9 are disengaged. The container is then rotated on the bearing 10 back into alignment with the chassis 12 of the rail car 7 and locked into position. The rail car 7 may then be transported via track 13 to the remote distribution point.

It is envisaged that the life expectancy of the containers is 3 or 4 times that of a road vehicle compaction trailer. The compaction container can easily be removed for
10 replacement or repairs. Tare weight of the compaction container is 8,200 kg with a load rating capacity to 40,000 kg. High capacity to 37 tonnes can be used where the processing plant or land fill is located in close proximity to rail and road transport on public roads is not required. Where public roads are utilised approximately 28 tonnes would be loaded unless special permits were available.

15 Depending on the rail corridor and the rating on the track, double container rolling stock can be used. The tare weight of a rail wagon suitable for 2 containers is approximately 24,000 kg. New wagons can be manufactured or existing rolling stock modified without difficulty.

Referring to Figures 3 and 4, unloading the waste from the rail cars 7 at or near the
20 land fill site is equally as convenient. A spur of track 13 is provided at a location convenient to the land fill site. The rail cars 7 are positioned such that the end 11 of the container 6 can be operatively engaged with the hydraulic unloading ram 15. The container 6 is rotated on bearing 10 such that it aligns with the telescopic arm 16 of the

12020507.050702

ram. Stabilising mounts 8 and 9 are engaged to provide the necessary resistance against the force of the ram 16. The ends 11 and 20 of the container 6 are opened so that the driving end 17 of the telescopic ram 16 can push the waste (not shown) out of the end 20 into the trailer of the truck 18.

- 5 The driving end 17 is self-aligning and runs on UHMW plastic bearings with sweepers (not shown) to completely clean the container 6. When the driving end 17 reaches its maximum stroke and begins to return misters located on the rear of the driving end commence spraying a fine mist of anti-bacterial deodorant.

- 10 Conveniently the floor of the trailer 19 is provided with a conveyor means such as a hydraulically powered slat type conveyor surface. A suitable surface is marketed under the trade mark Walking Floor®. Then it is a simple matter for the trucks to back the trailer up to the escarpment of the land fill site and simply convey the waste out of the trailer and over the edge of the escarpment.

- 15 It will be appreciated that a material handling system such as this has a number of inherent cost and time efficiencies. Through the use of a rail car having a container that rotates relative to the chassis many intermediate handling operations are removed. There is no need to load heavy haulage trucks at the regional transfer stations with containers filled with compressed metropolitan waste which are then in turn loaded onto rail cars and then similarly transferred back to trucks at the land fill site. The rail car according to
20 the present invention allows the present system which removes the need for heavy haulage trucks on the roads in metropolitan areas. Heavy haulage trucks are used at the land fill sites, however these trucks will often not need to use public roads and therefore

the normal weight limits will not apply. Consequently, fewer trucks are required to transport the waste to the escarpment of the land fill.

It is envisaged that a materials handling system provides particular opportunities for efficient waste management in small towns and rural communities. Utilising existing
5 methods the cost to small communities with low volumes of waste is enormous. High establishment costs for land fill in increasingly strict environment standards often results in sub-standard facilities which have difficulty meeting community expectations.

Using the present invention a small town transfer station could service a community of 5,000 and produce only one 25 tonne rail container every 2 days. The
10 filled container may be collected by the train on its way to the major land fill. Conveniently the train would leave behind an empty container to replace the one it collects.

A community of 50,000 people would require 6 containers to be collected everyday at a facility staffed by a single operator. Furthermore, the establishment costs are
15 relatively low and is easily adapted to incorporate a recycling and waste sorting facility.

The present invention has been described herein by way of example only and skilled workers in this field would recognise many variations and modifications which would not depart from the spirit and scope of the broad inventive concept.

10009947-050702

- 10 -

CLAIMS:

1. A rail car including:
a chassis adapted to travel on a track;
a longitudinally extending container having a closeable opening for loading or
5 unloading metropolitan waste material through at least one longitudinal end thereof;
means to enable interconnected displacement of the container relative to the
chassis to permit loading via the closeable opening; and
the container being adapted to stably withstand the compression of the waste
material within the container.
- 10 2. A rail car according to claim 1 wherein the means to enable interconnected
displacement of the container relative to the chassis is a bearing between the container
and chassis such that the container is selectively rotatable relative to the chassis.
3. A rail car according to claim 1 or claim 2 wherein both of the longitudinal ends
have a closeable opening for loading or unloading waste material.
- 15 4. A materials handling system including:
a rail car having a chassis adapted to travel on a track;
a longitudinally extending container for compacted material, the container having a
closeable opening for loading or unloading material through at least one longitudinal end
thereof, and means to enable interconnected displacement of the container relative to the
20 chassis to permit in situ loading via the closeable opening;
a loading means at a materials collection point for loading material into the
container through the opening;
a track for the rail car extending from the collection point to a remote distribution
point; and

- 11 -

an unloading means at the distribution point for unloading material from the container through the opening; wherein,

the container is displaced relative to the chassis to operatively engage the loading means and again displaced when unloading the material.

- 5 5. A materials handling system according to claim 4 wherein the means to enable interconnected displacement of the container relative to the chassis is a bearing between the container and the chassis such that the container is selectively rotatable relative to the chassis.
6. A materials handling system according to claim 4 wherein the material is loaded
10 and unloaded through the closeable opening.
7. A materials handling system according to claim 4 wherein the material is metropolitan waste and the collection point is a regional transfer station wherein the loading means includes a compactor for compressing the waste.
8. A materials handling system according to claim 7 wherein stabilising means are
15 provided to support and stabilise the rail car against forces generated by the compactor.
9. A materials handling system according to claim 4 wherein the distribution point is adjacent a land fill site and the unloading means is a hydraulically actuated telescopic ram capable of engaging the compressed waste through one opening in the container and pushing it out the opening in the other end of the container.
- 20 10. A materials handling system according to claim 9 wherein the telescopic ram pushes the compressed waste out of the other end of the container into the trailer of a heavy haulage truck.

1000947-050702

- 12 -

11. A material handling system according to claim 10 wherein the trailer of the heavy haulage truck is provided with a conveyor means along its floor for unloading the waste into the land fill area.

5 12. A method of transporting material between a collection point and a distribution point by rail using a rail car having:

a chassis adapted to travel on a track;

a longitudinally extending container having a closeable opening for loading or unloading material through at least one longitudinal end thereof; and

10 means to permit interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening, said method including:

providing loading means at the collection point;

displacing the container relative to the chassis to operatively engage the loading means and loading material through the opening;

15 returning the container to its original position relative to the chassis and transporting the rail car along the track to the distribution point;

providing an unloading means at the distribution point; and

displacing the container relative to the chassis to operatively engage the unloading means and unloading the material.

20 13. A method according to claim 12 wherein the means to enable interconnected displacement of the container relative to the chassis is a bearing between the container and the chassis such that the container is selectively rotatable relative to the chassis.

10009947-050702

14. A method according to claim 12 wherein the material is loaded and unloaded through the closeable opening.
15. A method according to claim 12 wherein the material is metropolitan waste and the collection point is a regional transfer station wherein the loading means includes a compactor for compressing the waste.
16. A method according to claim 15 wherein stabilising means are provided to support and stabilise the rail car against forces generated by the compactor.
17. A method according to claim 12 wherein the distribution point is adjacent a land fill site and the unloading means is a hydraulically actuated telescopic ram capable of engaging the compressed waste through one opening in the container and pushing it out the opening in the other end of the container.
18. A method according to claim 17 wherein the telescopic ram pushes the compressed waste out of the other end of the container into the trailer of a heavy haulage truck.
19. A method according to claim 17 wherein the trailer of the heavy haulage truck is provided with a conveyor means along its floor for unloading the waste into the land fill area.

20205074650001

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 December 2000 (21.12.2000)

PCT

(10) International Publication Number
WO 00/76820 A1

(51) International Patent Classification⁷: **B61D 3/04, 3/16, 47/00, B65F 9/00, B65G 63/02, 65/00**

(21) International Application Number: **PCT/AU00/00646**

(22) International Filing Date: **8 June 2000 (08.06.2000)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:
PQ 1810 9 June 1999 (09.06.1999) AU

(71) Applicant and
(72) Inventor: **BYRNE, Laurence, Michael [AU/AU]; 278 Hammond Avenue, Wagga Wagga, NSW 2650 (AU).**

(74) Agent: **BALDWIN SHELSTON WATERS; 60 Margaret Street, Sydney, NSW 2000 (AU).**

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

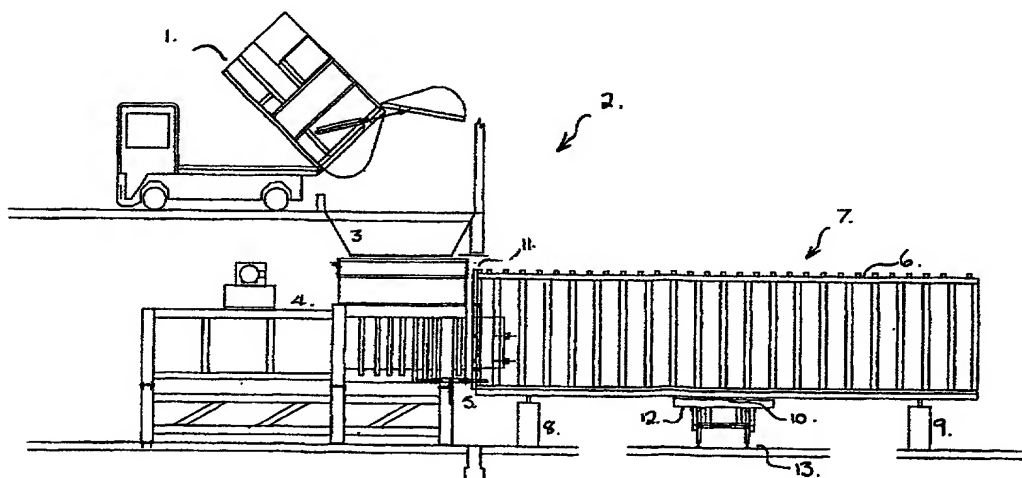
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **MATERIALS HANDLING SYSTEM**



(57) Abstract: A rail car (17) having a chassis (12) adapted to travel on a track (13); A longitudinal extending container (6) for compacted material, the container (6) having a closeable opening (11) for loading or unloading material through at least one longitudinal end thereof, and means to enable interconnected displacement of the container (6) relative to the chassis (12) to permit in situ loading via the closeable opening (11); a loading means (4) at a material collection point for loading material into the container (6) through the opening (11); a track (13) for the rail car (7) extending from the collection point to a remote distribution point; and an unloading means (15) at the distribution point for unloading material from the container (6) through the opening (11); wherein, The container (6) is displaced relative to the chassis (12) to operatively engage the loading means (4) and again when unloading the material.

WO 00/76820 A1

202050 24660001

202050* 2466000T

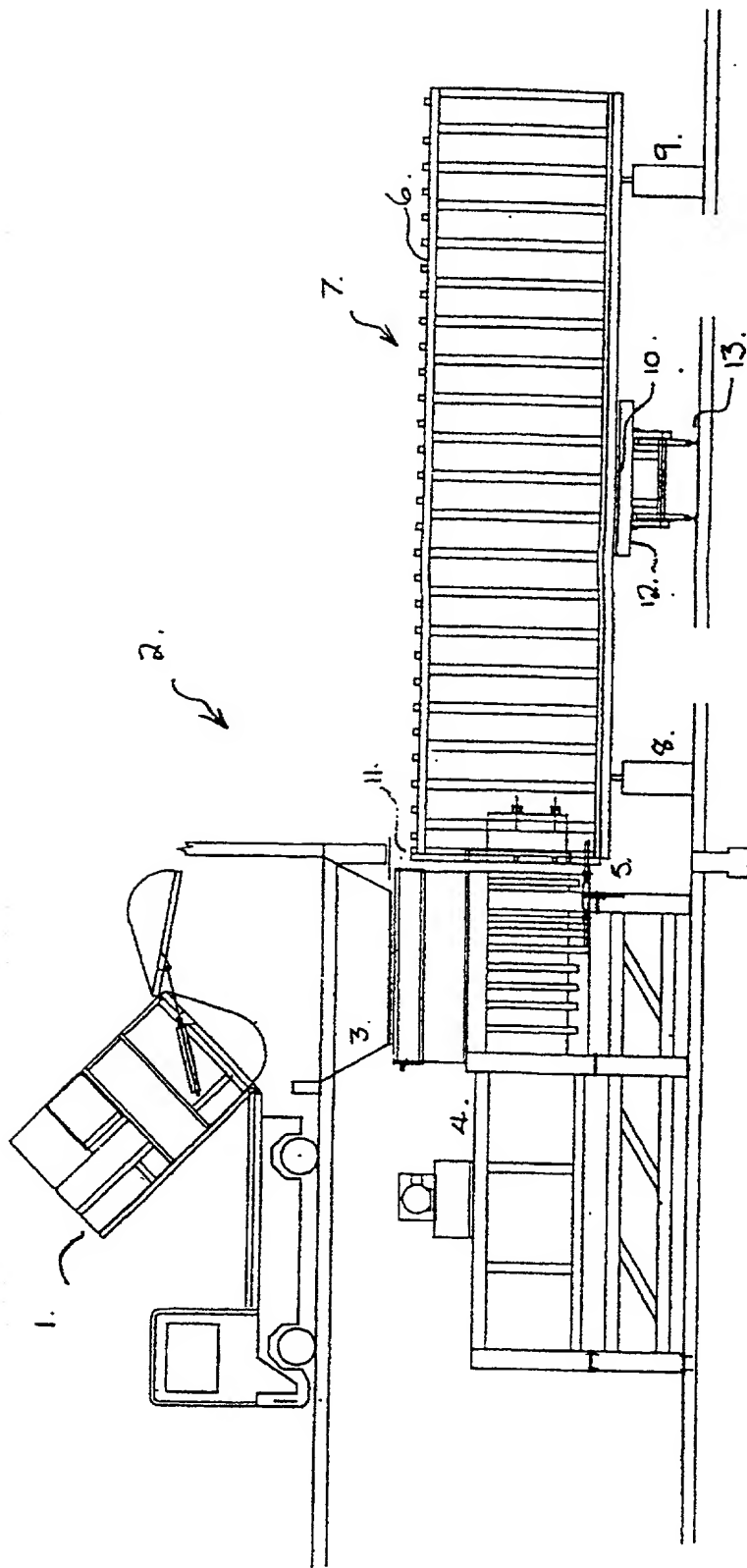


Figure 1.

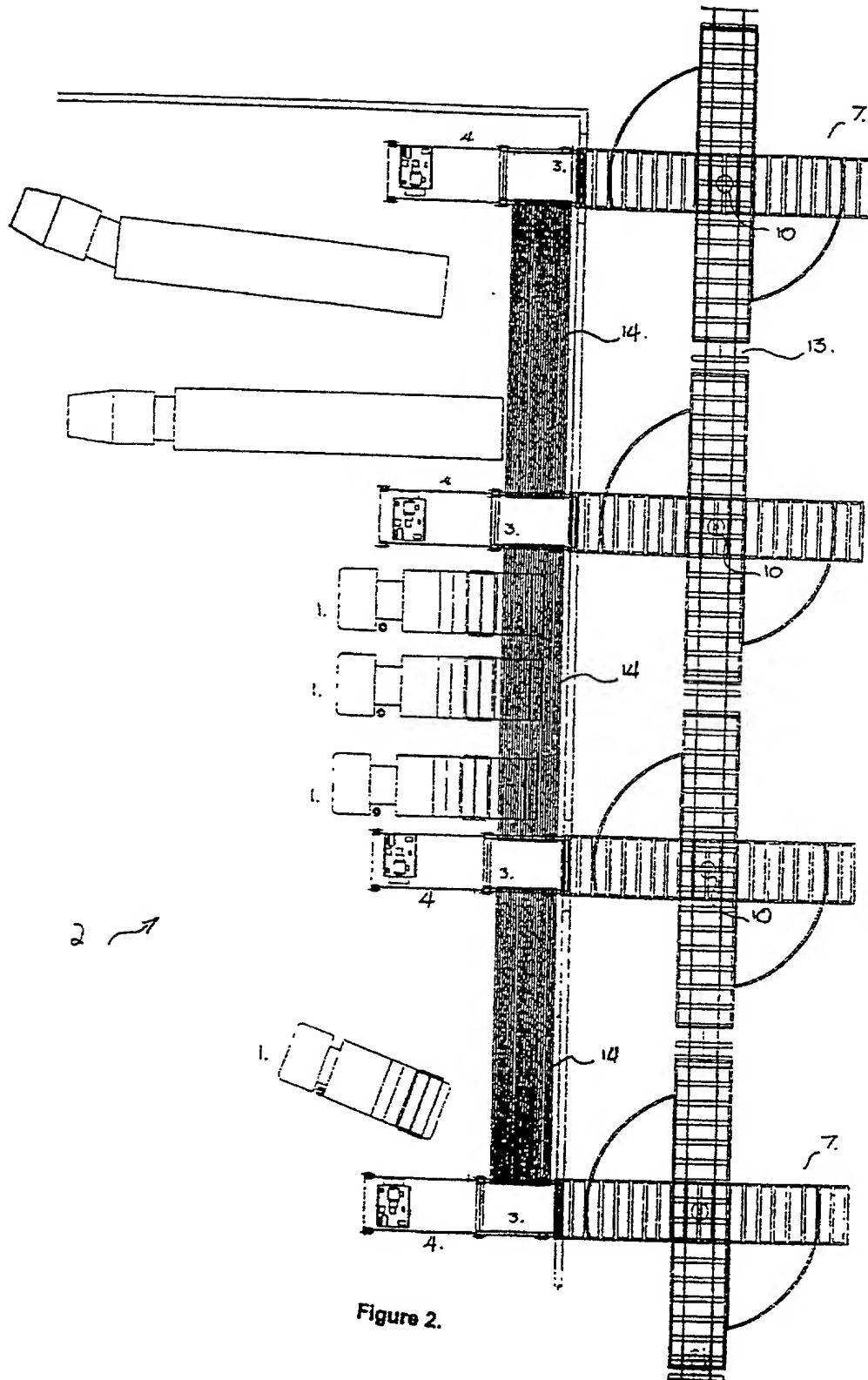


Figure 2.

10009947-050702

202050-21650001

WO 00/76820

10/009947
PCT/AU00/00646

3/4

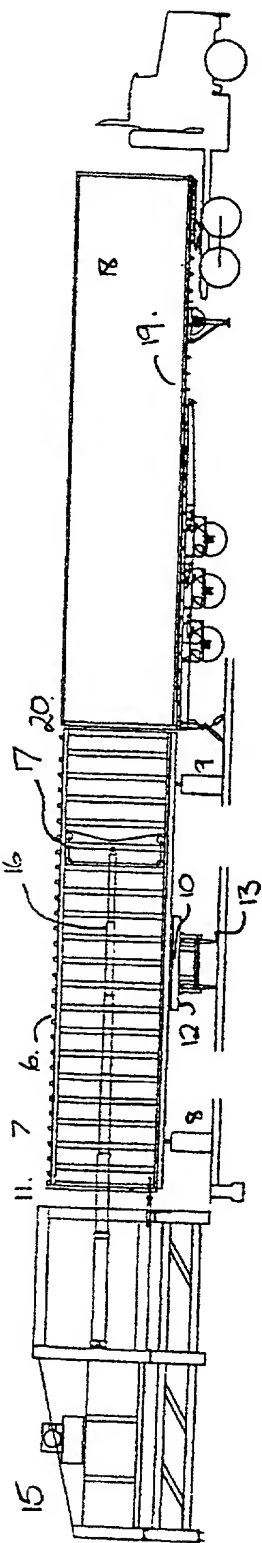


Figure 3.

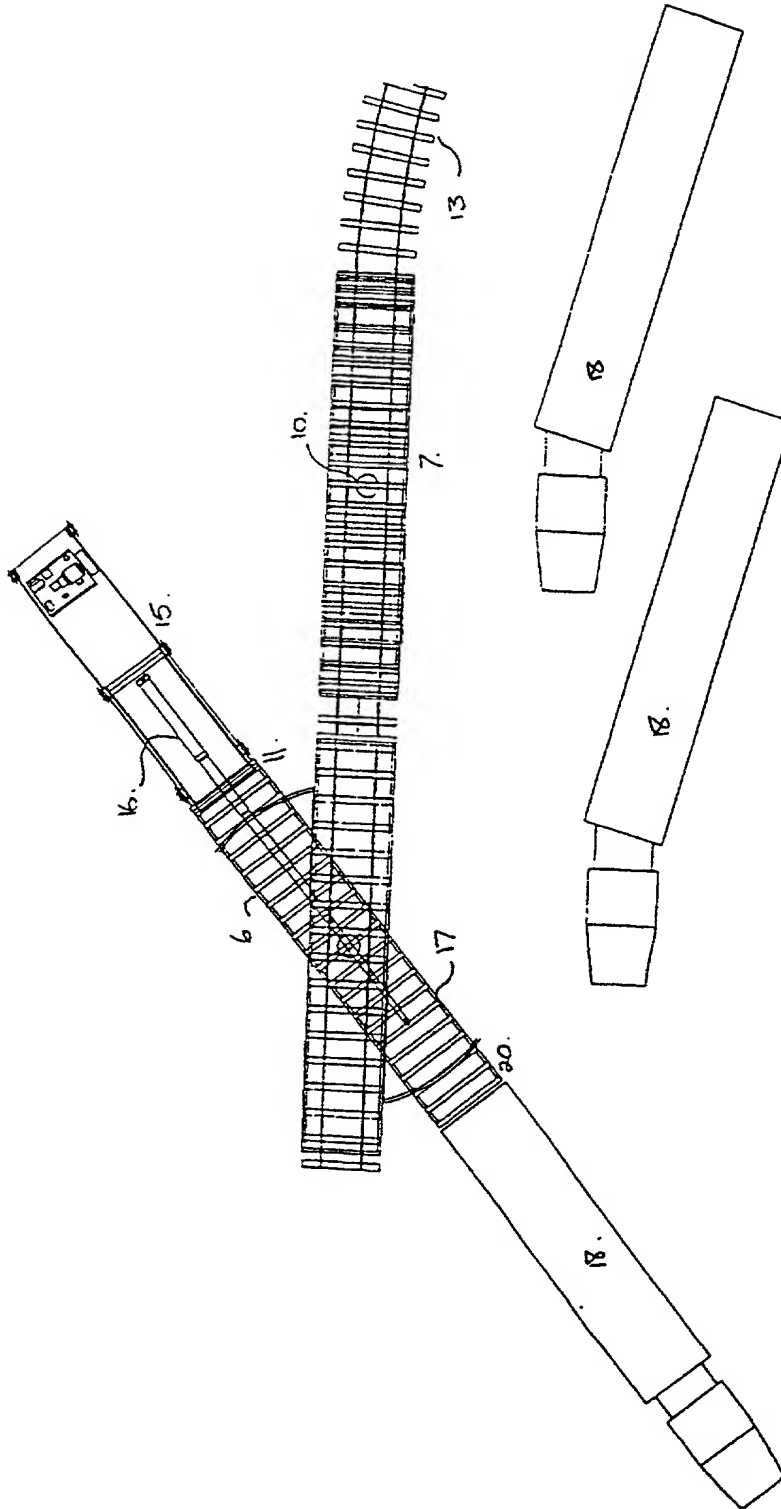


Figure 4.

DECLARATION AND POWER OF ATTORNEY- USA PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **MATERIALS HANDLING SYSTEM**; the specification of which was filed on **December 10, 2001** as Application Serial No. **10/009,947**.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above;

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56;

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

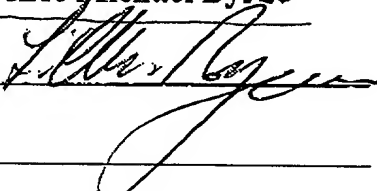
Priority
Claimed

No.: **PQ1810**Country: **Australia**Date Filed: **June 9, 1999****Yes**

POWER OF ATTORNEY: I hereby appoint the registrants of Knobbe, Martens, Olson & Bear, LLP, 620 Newport Center Drive, Sixteenth Floor, Newport Beach, California 92660, Telephone (949) 760-0404, Customer No. 20,995.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of the application or any patent issued thereon.

180
Full name of sole inventor: Laurence Michael Byrne

Inventor's signature 

Date

4/4/02.

Residence: 278 Hammond Avenue, WAGGA WAGGA NSW 2650, Australia

AUX

Citizenship: Australia

Post Office Address: Same as residence

Send Correspondence To:

KNOBBE, MARTENS, OLSON & BEAR, LLP

Customer No. 20,995

R:\DOCS\JWA\JWA-2379 DOC
021902

10009947-050702